

609TH IRAQI NATIONAL GUARD
BATTALION GARRISON
THI QAR GOVERNORATE, IRAQ

SIGIR PA-06-056
JULY 25, 2006

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SPECIAL INSPECTOR GENERAL FOR IRAQ RECONSTRUCTION

July 25, 2006

MEMORANDUM FOR COMMANDING GENERAL, MULTI-NATIONAL FORCES -
IRAQ
COMMANDER, GULF REGION DIVISION-PROJECT AND
CONTRACTING OFFICE, U.S. ARMY CORPS OF
ENGINEERS
DIRECTOR, IRAQ RECONSTRUCTION MANAGEMENT
OFFICE

SUBJECT: Report on Project Assessment of the 609th Iraqi National Guard Garrison,
Thi Qar Governorate, Iraq (Report Number SIGIR-PA-06-056)

We are providing this project assessment report for your information and use. We assessed the in-process construction work performed at the 609th Iraqi National Guard Garrison, Thi Qar Governorate, Iraq to determine their status. This assessment was made to provide you and other interested parties with real-time information on a relief and reconstruction project in order to enable appropriate action to be taken, if warranted. The assessment team included an engineer and an auditor.

This report does not contain any negative findings. As a result, no recommendations for corrective action are made. The Commander, Gulf Region Division-Project and Contracting Office, U.S. Army Corps of Engineers, did provide comments on some information contained in the draft report and those comments are included in this report. Further management comments are not required.

We appreciate the courtesies extended to our staff. This letter does not require a formal response. If you have any questions please contact Mr. Brian Flynn at (703) 604-0969 or brian.flynn@sigir.mil or Mr. Andrew Griffith, P.E., at (703) 343-9149 or andrew.griffith@iraq.centcom.mil.

Stuart W. Bowen, Jr.
Inspector General

Special Inspector General for Iraq Reconstruction

SIGIR PA-06-056

July 25, 2006

609th Iraqi National Guard Battalion Garrison, Thi Qar Governorate, Iraq

Synopsis

Introduction. This project assessment was initiated as part of our continuing assessments of selected sector reconstruction activities for Facilities and Transportation. The overall objectives were to determine whether selected sector reconstruction contractors were complying with the terms of their contracts or task orders and to evaluate the effectiveness of the monitoring and controls exercised by administrative quality assurance and contract officers. We conducted this project assessment in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included a professional engineer and an auditor.

Project Assessment Objectives. The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The Contractor's Quality Control plan and the United States Government's Quality Assurance program were adequate;
4. Project results were consistent with original objectives; and
5. Project sustainability was addressed.

Conclusions. The assessment determined that:

1. The project components were adequately designed prior to construction. The United States Army Corps of Engineers' architectural and engineering consultant developed a generic design package to be used for the construction of four battalion garrisons including the 609th Iraqi National Guard Battalion. The design also took into account local availability of materials and labor skills.

The design was based on the original scope of work, and for the majority of the garrison's buildings and facilities, the plans and specifications provided an accurate depiction of the task order requirements. However, the utility system (water and electric) design drawings were not updated to reflect the deleted requirements from Modification 01 and the shift in building site location after the construction had started. In addition, the original design required two, 1600-kilo volt amp electrical generators for the garrison. Documentation provided by the United States Army Corps of Engineers Project Engineer indicated the generator requirements were reduced to two, 1130-kilo volt amp generators, but there was no design analysis provided or revised electrical one line diagram to support the revised requirements. Nonetheless, the contractor was able to properly install the generators and make the necessary electrical connections. Although the utility drawings were not updated to

reflect the most current requirements, the construction contractor constructed the majority of the 609th Iraqi National Guard Battalion garrison facilities using the original set of design drawings and specifications.

2. The completed project work we observed met the standards of the design. We did note some areas particularly in the toilet and shower buildings where the quality of finish work was marginal. The marginal finish work in some parts of the garrison's buildings could be attributed to the task order requirement for the contractor to employ a local Iraqi labor force, which was largely unskilled. Although, the unskilled labor presented challenges in constructing the garrison, the U.S. Army Corps of Engineer Project Engineer and U.S. Army Corps of Engineers local national Quality Assurance Representatives were fully engaged in construction activities to ensure quality and compliance with the task order requirements. As a result, the project is providing the Iraqi military with additional garrison facilities for up to 850 army personnel.
3. The project's quality management was effective in ensuring the construction of the 609th Iraqi National Guard Battalion. The contractor's Quality Control plan was sufficiently detailed to guide the contractor's quality management program effectively. Further, the contractor's daily Quality Control reports contained required project and work activity information to document construction progress and identified problems. The Government Quality Assurance program was effective in monitoring the contractor's quality control program. The Project Engineer and the local national Quality Assurance Representative ensured that all deficiencies cited during quality assurance inspections were corrected.
4. The 609th Iraqi National Guard Battalion garrison project results were consistent with the original task order objectives. The completed project work resulted in a fully functional garrison for the Iraqi military. This occurred because the U.S. Army Corps of Engineers Project Engineer and U.S. Army Corps of Engineers local national Quality Assurance Representative effectively managed the project.
5. Sustainability was addressed in the contract specifications. The contract specifications required operational and maintenance training for all systems furnished under the contract. In addition, contract specifications required training for the operating and maintenance personnel, and the system manufacturer was to provide the training. The contract also included the normal one-year warranty on individual items, equipment, and systems.

Recommendations. This report does not contain any negative findings or recommendations for corrective action. Therefore, management comments are not required.

Management Comments. The Gulf Region Division, U.S. Army Corps of Engineers, concurred with the conclusions in the report. Further, they provided additional comments regarding the information in the report.

Evaluation of Management Comments. SIGIR acknowledges the additional information provided by Gulf Region Division, U.S. Army Corps of Engineers.

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Introduction

Objective of the Project Assessment

The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The Contractor's Quality Control (QC) plan and the U.S. Government's Quality Assurance (QA) program were adequate;
4. Project results were consistent with original objectives; and
5. Project sustainability was addressed.

Pre-Site Assessment Background

Contract, Task Order, and Costs

The Iraqi National Guard Base project was completed under Contract W916QW-05-D-0012, dated 16 November 2004, an indefinite delivery, indefinite quantity contract with a firm-fixed price, not to exceed \$200,000,000.00. The contract was between the United States Army Corps of Engineers (USACE) Gulf Regional Division and Abdullah Aljiburi General Construction Company, Baghdad, Iraq.

Task Order 0003, dated 30 December 2004, was a firm-fixed price task order for \$7,489,573.00 to construct an Iraqi National Guard Base that was to accommodate 850 officers, warrant officers, non-commissioned officers, and enlisted personnel in a fully functional garrison.

There were four modifications to the contract W916QW-05-D-0012 task order 0003.

- Modification 01, issued 17 July 2005, increased the contract price by \$2,467,799.00, from \$7,489,573.00 to \$9,957,372.00. In addition, Modification 01 extended the contract's completion date to 30 October 2005, which supersedes the letter dated 31 May 2005.
- Modification 02, issued 8 September 2005, extended the contract period of performance to a new completion date of 15 November 2005.
- Modification 03, issued 19 November 2005, extended the contract period of performance to a new completion date of 21 December 2005.
- Modification 04, issued 17 April 2006, included additional work in order to have a fully functional facility. In addition, the result of the additional work increased Task Order 0003 by \$708,113.00, from \$9,957,372 to \$10,665,485. The additional work's period of performance is 60 days from the modification award date.

Project Objective

The objective of this project was to construct a garrison for the 609th Iraqi National Guard (ING)¹ Battalion in the Thi Qar Governorate, Iraq. The garrison, one of three similarly constructed battalion garrisons in southern Iraq, will help sustain the Iraqi security forces in their mission to defend Iraq against internal and external security threats. The completed battalion garrison will accommodate 850 officers, warrant officers, non-commissioned officers, and enlisted personnel.

Description of the Facility (preconstruction)

The description of the facility (preconstruction) was based on information obtained from the USACE project file. The site for the garrison is located approximately 40 kilometers (km) north of the city of Nasiriyah in the Thi Qar Governorate in a rural area. The topography of the site is level. Local utilities, electric and water, are available in the vicinity of the garrison.

Scope of Work of the Contract

Based on the Task Order requirements for the project, the scope of work included the construction of a self-contained garrison for a battalion of 850 Iraqi soldiers. Specific requirements for the 609th ING Battalion garrison included construction of the following:

- Perimeter security wall, entrance gate, and guard towers
- Office building
- Officers quarters/club
- Laundry facilities for officers and for soldiers
- Battalion headquarters
- Mosque
- Medical center
- Sport room
- Dining facility for officers and enlisted personnel
- Three, two-story barracks
- Logistics building which includes a vehicle maintenance facility
- Ammunition storage building
- Weapons storage guard house building
- Four stand-alone toilet and shower facilities
- Five company offices buildings
- One parade ground
- Water storage and pumping facility
- Generator and transformer facilities
- Parking lots, interior roads, and pathways

In addition, Modification 04 finalized on 17 April 2006, which was after our 10 April 2006 site visit, included the following:

¹ In some of the project documentation we reviewed in conducting the assessment, the 609th ING Battalion has been referred to as “2 / 3 10 ID” which is a designation for 2nd Battalion, 3rd Brigade, 10th Infantry Division. Since the contract task order and modifications refer to the unit as 609th Iraqi National Guard, for consistency, this report uses “609th ING Battalion” to describe the garrison unit.

- Provide a complete telephone system
- Connect the garrison's water system to the local water distribution system
- Construct a drainage system for the garrison to remove surface runoff from the site
- Supply two additional 20,000 liter fuel tanks for the generators
- Connect the garrison to the national electrical grid
- Construct two additional guard towers along the perimeter wall
- Provide concrete walkways between buildings
- Construct a covered outside food preparation area adjacent to the dining facility's kitchen

Current Project Design and Specifications

The scope of work (SOW) did not require project design submittals and approvals because it was solely for construction services. USACE utilized the same architectural and engineering (A-E) consultant for the design of the garrison facilities for four battalions of the Iraqi military. The design was completed under a separate contract.

The design included plans and specifications for every facility within the scope of work. The design package consisted of architectural, civil, electrical, mechanical, and structural drawings for the garrison buildings and facilities. The drawings contained plan views, elevations, typical details, and utility system flow diagrams. The architectural drawings delineated functional layouts, space allowances, and special features within each building's floor plan.

Structural drawings included plan and cross sectional views of structural members (reinforced concrete footers, columns, beams, floor, and roof slabs). Mechanical drawings included plumbing plans and details for water and sanitary sewer systems, as well as plans and details for central and individual room heating, ventilation, and air conditioning (HVAC) systems. Electrical drawings contained power generation and distribution system plans, details, and system one-line diagrams. The electrical drawings also included lighting (interior and exterior) plans and details.

The design was based on the original scope of work. Modification 01 changed the scope of the project by de-scoping some of the original requirements from the project. The original scope included a two-story, 2,267-square meter (m²) classroom building, and a 1,254-m² club/theater, which were subsequently de-scoped from the project. The original scope also included a two-story office building, which was reduced in size to one story. Additionally, building location changes to the original garrison site plan were made. The logistics building and the ammunition building locations were moved approximately 200 meters (m). In addition, the transformer building and generator building sites were moved from a remote corner of the garrison compound to a more central location.

Based on the review of the design package provided to us, the changes to the scope and site plan noted above were not incorporated into the design drawings. The utility plan in the design package showing the water supply line and valve locations was not updated to reflect the revised site plan with

new building locations. Further, the electrical one line diagram still showed circuits and feeders going to the classroom building and the club/theatre.

In addition to the design drawings, the A-E consultant prepared construction specifications in Construction Specifications Institute format to describe the required standards expected to be achieved. Further, the specifications required all works for the garrisons to be “carried out to National Iraqi Standards or equivalent British/American Standards where/as applicable.”

The specification sections also required submittals. For example, Section 08800 *Glass and Glazing*, required two submittals: (1) product data on the glass to be used on the project; and (2) a 300 millimeter (mm) x 300 mm glass sample. As another example, Section 10800, *Toilet Accessories*, required the following submittals: (1) manufacturer’s product data sheets; (2) a schedule, indicating types, quantity, and model numbers of accessories for each location in which the accessories will be installed; and (3) sample color chips indicating each manufacturer’s full range of colors available for selection. Similar requirements were contained in other specification sections.

Although submittals were required by the specifications, discussions with the USACE Project Engineer (PE) indicated a formal submittal and review process was not used during the construction of the 609th ING Battalion garrison. The USACE PE took over management of the project in August 2005, when the project was 63% complete, and the submittal process had already been established. The same design and construction contractor had been utilized for the construction of two of the three previous ING garrison projects. According to the USACE PE, material and equipment utilized on the 603rd and 608th ING Battalion garrison construction was the same being used on the 609th ING Battalion garrison project. Thus, required equipment product data and material product information and samples were not submitted for review on the 609th garrison project since they had been previously approved for use on the other ING Battalion projects.

In addition to the specification requirements regarding material and standards, the SOW required the contractor to utilize local Iraqi materials and labor to the extent consistent with the quality requirements of an ING garrison. The SOW also established a requirement for the use of local labor and materials. Specifically, the SOW stated:

“Local Iraqi materials and labor are to be utilized to the extent consistent with higher standards required for garrison of this stature. When local Iraqi materials and labor are not consistent with quality requirements, labor and materials from the immediate region will be utilized.”

The USACE PE confirmed that the construction contractor on the 609th garrison had to the greatest extent possible, utilized local Iraqi skilled and unskilled labor and materials to construct the garrison’s buildings and facilities.

In summary, based on our review of the SOW and A-E consultant’s drawings and specifications, as well as discussions with the USACE PE, the design package was sufficient to construct the 609th ING Battalion garrison. Although, the design drawings we reviewed were not updated to reflect the most current site plan and the de-scoping changes associated with Modification 1, the construction contractor was able to utilize them to construct three Iraqi Army garrisons, including the 609th ING Battalion garrison.

Site Assessment

On 10 April 2006, we performed an on-site assessment of the 609th ING Battalion garrison project. According to the USACE PE, the project was 99% complete at the time of our assessment. Except for punch list items and pending project work under Modification 04, the garrison buildings were essentially complete. Further, three days after our site visit, GRS officially turned over the completed facilities to the Iraqi military.

The on-site assessment included inspections of a majority of the facilities included in the task order scope. The inspections of these facilities are summarized in this section of the report. The facilities we did not tour included the following:

- Guard house and weapons storage building
- Office building
- Ammunition supply building
- Officers' quarters and club
- Soldiers' laundry
- Guard towers
- Concrete parade field
- Paved entrance, parking lot, and main road inside the garrison

The 609th ING Battalion garrison buildings were designed with the same architectural style. The majority of the buildings are reinforced concrete structures infilled with exterior masonry walls. Site Photo 1 shows the style of construction that was utilized at the 609th ING garrison.



Site Photo 1. Buildings at the 609th ING Battalion Garrison

Work Completed

The site assessment team inspected for pertinent design requirements at each of the completed buildings and facilities. In addition, the assessment team's summarization of on-site observations for each of the completed buildings and facilities are below.

Barracks

The task order SOW required construction of three, 2-story barracks for the battalion's enlisted personnel. The design required 10 "sleeping" rooms, each approximately 57 m² in size, which included plastered walls and ceilings, terrazzo tile floors, aluminum frame windows, wooden interior doors, and steel exterior doors. Each room was designed to house sixteen soldiers. The barracks were not air conditioned, but the design for each room included four ceiling fans and fluorescent lighting. The room designs did not include electrical outlets, and the contractor did not provide any electrical outlets in the room. The roof design called for a flat, built up roof, with surrounding parapet.

We inspected each of the three barracks buildings. Site Photo 2 shows the exterior of one of the three buildings.



Site Photo 2. Exterior view of one of the three barracks

The rooms we inspected were finished in accordance with the design. Each room contained the required number of ceiling fans, lighting fixtures, and controls. The walls and ceilings were plastered and painted, and the flooring finished with terrazzo tile. Doors and windows appeared to be installed properly, although on some of the exterior doors, there were narrow gaps around the door between the door and the frame. We discussed this with the USACE PE, who initiated corrective action to have the contractor install weather stripping and door sweeps. Site Photo 3 provides a representative example of one of the barracks rooms, showing the aluminum windows, one of the exterior metal doors, and the wall mounted lighting and ceiling fan switches.



Site Photo 3. One side of a typical barracks room

The design for each barracks building required two external stairways to access the second story and the roof. The design called for concrete steps, with no finish to the step other than painting. However, marble tile had been placed as the finish for each step in all six sets of stairs in the three buildings. According to the USACE PE, the contractor installed the marble tile at no additional cost to the Government. Site Photo 4 provides an example of one of the sets of stairs finished with the marble tile.



Site Photo 4. Exterior stairs in the barracks finished with marble tiles

We also inspected the roof of one of the barracks buildings. The roof design for garrison buildings required a built up roof consisting of the reinforced concrete roof slab covered with a waterproofing membrane and thermal insulation board. The design required the insulation board to be covered with a nylon sheet, then with

150 mm of clean soil compacted and sloped for drainage to the roof drains. The surface layer of the roof consisted of 800 millimeter (mm) x 800 mm x 40 mm precast concrete tiles. Based on our observations and a through review of the construction progress photos provided by the USACE PE, we verified the roof of the barracks building was constructed as designed. Site Photo 5 shows the roof system consisting of a top layer of concrete tiles, with sealed joints between the tiles. In addition to the tiles, roof drains (100 mm in diameter) were in place at the corners of the roof as required by the design, and connected to drain pipes hung along the exterior walls.



Site Photo 5. Roof on one of the barracks buildings

Company Headquarters Buildings

The design required five (10 m x 16 m) company headquarters buildings. Each of the company headquarters buildings was in front of a barracks building, with an open breezeway separating the two buildings. The company headquarters building floor plan included offices, bathrooms, and a meeting room. Except for the bathrooms, the required interior finishes were similar to the barracks, painted plastered walls and ceiling, and terrazzo tiled floors. The design also required florescent light fixtures, ceiling fans, and electrical outlets in each room. In the bathroom, the design called for two water closets with western toilets, two pedestal washbasins for hand washing, and ceramic tile floors and walls.

The design also required window HVAC units, although the contractor installed split system units instead of window units after they proposed the substitution at no cost change to the Government. The USACE Resident Office subsequently approved the change. Site Photo 6 shows the exterior of one of the company's headquarters, which includes three of the HVAC condensing units mounted on the exterior wall.



Site Photo 6. Company headquarters building

Based on the review of the design, and our observations on site, the construction of the company headquarters buildings met the requirements of the design.

Shower and Toilet Buildings

The project site plan showed four separate “shower and toilet” buildings, located directly across the main garrison road from the company headquarters buildings and the barracks. The design required four identical 12.4 m x 12.0 m buildings. The exterior walls were load bearing block walls supported by continuous perimeter footings. The structural and architectural design drawings did not provide details about the block walls, other than the dimensions including the thickness (25 mm). The specifications for load bearing walls (*Sand Lime Masonry Walls*) stated:

“Where required, provide load bearing solid, normal weight sand lime masonry units which shall conform to ASTM C73 (*Standard Specification Calcium Silicate Bricks (Sand Lime Bricks)*).”

Based on the review of the USACE construction progress photos and our own observations on site, the shower and toilet building exterior walls consisted of a composite wall constructed with an outside veneer of thin limestone block anchored to masonry wall, two brick units thick. The design drawings and specifications did not contain details of this type of composite wall.

Site Photo 7 shows the exterior of the composite wall during construction and Site Photo 8 illustrates a completed shower and toilet building.



Site Photo 7. Shower and toilet building under construction (Photo provided by USACE)



Site Photo 8. Completed shower and toilet building

The interior design for each building required 20 water closets with eastern style toilets, 20 individual shower stalls, and 28 hand washing stations. The interior finishes included ceramic tile floors and walls. The design also required individual wood doors for each water closet and shower stall. Site Photo 9 provides an example of the hand washing stations in one of the shower and toilet buildings.



Site Photo 9. Hand washing station in one of the shower and toilet buildings

Based on the review of the design and our observations, the shower and toilet buildings and interior finishes appeared to be constructed as designed. However, similar to the barracks buildings, on some of the doors, there were gaps between the exterior door and the doorframe as seen in Site Photo 9. As noted earlier, the USACE PE, subsequent to this site visit, instructed the contractor to correct the problem and the contractor agreed to install weather stripping and door sweeps.

In addition to the doors, we found the floor tile in many areas needed cleaning. According to the USACE PE, this had been a continual problem and it had been

listed as a deficiency on the USACE Quality Assurance Representative's deficiency tracking log. Additionally, in some areas, particularly near the walls or corners of the showers or water closets, we found the quality of workmanship associated with the ceramic floor tile grouting to be poor. Site Photo 10 provides an example of grouting workmanship, showing excess material left on the floor tile and dirty grout. One factor affecting the quality of workmanship, especially with finish work activities, was the requirement to utilize local labor. The USACE PE informed us that in order to maintain good relations with the local Iraqi leaders, the contractor was compelled to hire local labor, the majority of which were unskilled. The use of unskilled labor on this project directly influenced the quality of workmanship.



Site Photo 10. Dirty and excess grout material left on ceramic tiles

Kitchen and Restaurant Building²

The task order SOW required a kitchen and restaurant building (dining facility) to provide meal service for Iraqi soldiers. The architectural floor plan included a 900 m² facility, consisting of a central kitchen servicing two separate dining rooms, one for the officers and the other for the enlisted soldiers. The mechanical design required the dining rooms to be cooled with two, 20-ton central HVAC units. Site Photo 11 shows an exterior view of the one side of the dining facility, which includes the two central HVAC units. The original design for the kitchen area called for five individual, 2-ton window HVAC units. However, due to budget constraints, the five individual HVAC units were de-scoped from the project.

² Referred to in the design as “kitchen and restaurant” building. Hereafter, we will refer to the “kitchen and restaurant building” as the “dining facility.”



Site Photo 11. One side of the dining facility with the two central HVAC units

The dining facility interior design included aluminum frame windows, metal exterior doors, and terrazzo tile floors. In the kitchen, the design required glazed ceramic tile on the wall up to the door height. Beyond that height, the wall was to be plastered and painted. In the two dining rooms, the original design required plastered and painted walls and ceiling. Prior to construction, the contractor requested, and received approval to install a suspended acoustical ceiling in the dining areas, which included the recessed fluorescent lights and the diffusers for the HVAC system. In addition, the contractor installed glazed ceramic tile on the lower portion of the walls in the dining rooms and on the columns in the enlisted dining room. Site Photo 12 illustrates the enlisted dining room and its interior finishes including the suspended ceiling, floor tile, and wall coverings. To augment the HVAC system, the contractor installed fans in the dining rooms as required by the design. The contractor also installed in compliance with the design, eight pedestal style washbasins in the enlisted dining room and four in the officer dining room.



Site Photo 12. Enlisted dining area

In the kitchen area, the design required the installation of a stainless steel utility sink and 80 liter water heater. Kitchen equipment procurement and installation were not part of the project scope, but the kitchen design featured additional electrical outlets for the Iraqi Army. The electrical design for the kitchen also included a main distribution panel containing dedicated circuits to accommodate the increased electrical power requirements for kitchen equipment. Site Photo 13 shows one side of the kitchen, including the surface mounted electrical outlets along the walls.

Based on the review of the contract requirements, the design, and our observations on site, the construction of the dining facility met the requirements of the design. When the Iraqi Army moves into the garrison, they should be able to establish a functional dining facility in this building.



Site Photo 13. One side of the kitchen area in the dining facility

Sport Room, Mosque, and Medical Clinic

These three facilities were co-located in the same structure under one roof, although the medical clinic was separated from the other two by a covered breezeway. Diagram 1 provides the layout of the facilities. In addition to the three facilities, the building contained a lavatory with eastern style toilets and a separate hand wash area similar to the type of hand wash stations in the shower and toilet buildings.

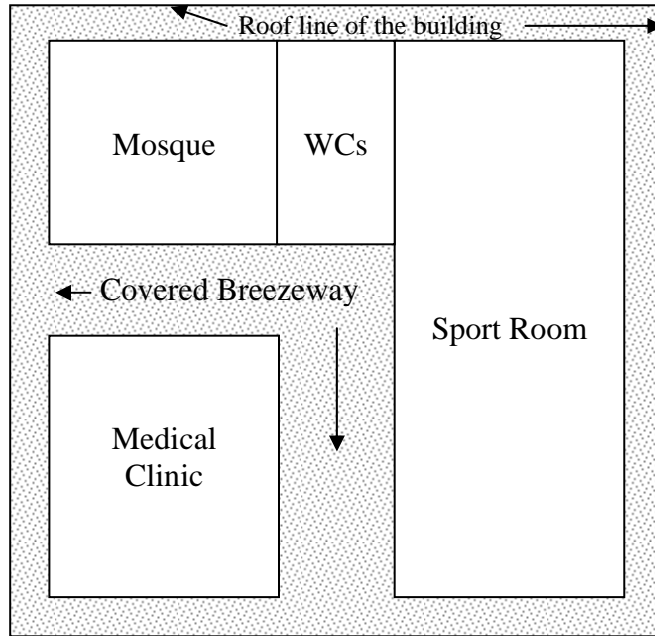


Diagram 1. The layout of the sport room, lavatory, mosque, and medical clinic

Sport Room

The design for the 11.8 m x 30 m sport room, which included an office and a storeroom, required plastered and painted walls and ceilings, terrazzo floors, aluminum frame windows, wood interior doors, and metal exterior doors. The original design required window air conditioning units, but the air conditioning units were de-scoped from the project prior to construction. Site Photo 14 shows the sport room. In the absence of air conditioning, the contractor had placed fans along the walls. In addition, instead of a plastered and painted ceiling, the contractor installed a suspended acoustical ceiling after requesting and receiving approval from the USACE Area Office. Based on our observations of the sport room construction, the facility as constructed, met the requirements of the design.



Site Photo 14. Sport room with adjoining office and store room

Mosque

Similar to the sport room, the architectural design for the 10 m x 10 m Mosque included terrazzo-tiled floors, plastered and painted walls, and aluminum frame windows. The contractor installed a suspended acoustical ceiling in lieu of a plastered and painted ceiling. In addition, the original design required window HVAC units, but as mentioned earlier, the contractor substituted split system units after receiving approval from the USACE Area Office. In constructing the Mosque, the contractor included several enhancements. The contractor provided a “mihrab”³ as shown in site Photo 15. In addition, the contractor hung framed inspirational verses from the Koran on the walls, and the contractor installed patterned window and wall coverings.



Site Photo 15. View of the Mihrab in the mosque

Medical Clinic

The 11 m x 15 m medical clinic floor plan layout in the architectural design included treatment rooms, a pharmacy, patient waiting areas, and a bathroom. The design required a pedestal type washbasin in each treatment room and the pharmacy. The required interior finishes included plastered and painted walls, terrazzo tile floors, and fluorescent lighting. The design also required individual HVAC units to be installed in each treatment room, the pharmacy, and the waiting area, and the contractor installed split system units in these rooms. We did not observe any noticeable deficiencies in the construction of the medical clinic.

Officers' Laundry

The officers' laundry design required a separate 6 m x 6 m reinforced concrete structure, infilled with sand lime masonry block. The laundry consisted of one room equipped with piping and hookups for two industrial washers and dedicated electrical circuits and electrical power outlets for the two washers and two industrial dryers.

³ A niche or chamber in a mosque indicating the direction of Mecca

The washers and dryers were not part of the scope of work and were to be provided by the Iraqi military. The laundry's required interior finishes included ceramic tile floors, ceramic tile walls (on the lower half with the upper half plastered and painted), as well as plastered and painted ceilings. Site Photo 16 shows the interior of the laundry, including some of the piping, connections and power outlets for the washers. Our observations indicated the laundry construction satisfied the design requirements.



Site Photo 16. Interior of the officer laundry

Generators and Transformers

The design required two, 1600 Kilo Volt Ampere (kVA) generators. The current source of power for the garrison at the time of the turnover to the Iraqi Army was from the installed generators. During the site visit, we verified there were two ASKA generators installed, powered by Cummins diesel engines. Site Photo 17 shows one of the two generators installed at the garrison. In inspecting the generators, we could not locate the factory nameplate containing the kVA rating so we were not able to verify the capacity of the generators. The USACE PE subsequently provided the model number on the generator diesel engine, which is Cummins QST30-G4. This diesel engine powers an AKSA model ACQ 1130 generator, rated at 1026 kVA.

The generators' size and capacity requirements were recalculated after the project started, resulting in smaller generator needs. According to the USACE PE, the requirements changed because Modification 01 de-scoped the classroom and club/theater buildings from the project. In addition, the generator site location was moved from the original remote location to a more central location closer to the garrison's other buildings.⁴

⁴ Moving the generator building site location to a more central location would improve efficiency in power distribution and minimize voltage drop because of the shorter distances from the generators to the garrison's buildings.



Site Photo 17. One of the two electrical generators installed at the garrison

The design required housing the two generators in a reinforced concrete structure with sand lime block-walls similar to the others constructed at the garrison. However, with the shift in site generator locations, a decision was made by USACE to use a pre-engineered metal building to house the generators instead of the reinforced concrete structure. Site Photo 17 provided by USACE, shows the metal building while under construction prior to painting.



Site Photo 18. Generator building while under construction (Photo provided by USACE)

Transformers

Two transformers, 11 kilovolt (kV) to 416 volt (V) were required by the design to be housed in a separate building from the generators. Based on the electric wiring diagram included in the design, the transformers were needed to step down the voltage from the incoming 11 kV feeders to 416 V. At the time of the assessment, the generators provided the only source of electrical power for the garrison. Connections to the commercial 11 kV grid were part of the pending work associated with Modification 04. In addition to the transformers, the electrical design also required automatic transfer switches for the generators, main electrical switchboards, and various sizes of conduit and cables. The building design floor plan required an 8.4 m x 16.4 m facility divided into three rooms for the transformers, switchboards and other equipment. To accommodate the running of conduits and to facilitate connections on the high and low side of the transformers and connections to the switchboards, parts of the concrete floor were recessed and covered with metal plates. While on site, we verified the presence of two 11kV – 416 V transformers and the switchboards containing the main distribution circuits to the garrison buildings and facilities. The equipment was installed in a three-room building that was constructed with a reinforced concrete slab and roof, as well as reinforced concrete columns and beams. The exterior walls were constructed with sand lime block. Although the assessment team did not perform a detailed inventory of equipment, the building and its components appeared to meet the requirements of the design.

Logistics Building

The design required a 623 m² reinforced concrete structure infilled with sand lime block walls. Site Photo 19 provides an exterior view of the logistics building.



Site Photo 19. Logistics building

The building floor plan included rooms for offices, workshops, equipment and material storage, and vehicle maintenance. The roof height for the vehicle maintenance and equipment and material storage rooms was set at 5.2 m above the floor slab, whereas in the other areas, the roof height was set at 3.5 m above the floor slab. The vehicle maintenance areas included a requirement for three rollup doors (two at 3.5 m wide by 4 m high, and one at 4 m wide by 4 m high). The design called for painted and plastered interior walls, ceilings, and concrete floors in the vehicle maintenance area, equipment storage area, and material storage area. In the offices and smaller workshops, required interior finishes included painted and plastered walls and ceilings, terrazzo floors, aluminum frame windows, wood interior and metal exterior doors. In addition, the design called for individual room air conditioning units in the offices and workshops.

We did not find any noticeable deficiencies during our tour of the facility. The construction of the logistics building appeared to meet the requirements of the design.

Water Storage Facility

The water storage facility consisted of two reinforced concrete water storage tanks connected to an adjacent reinforced concrete enclosure for the water booster pumps, valves, filters, and piping. There was no incoming supply line to the tanks. At the time of the assessment, trucks delivering water to the garrison site supplied the water in the tanks. However, in Modification 04, part of the scope includes bringing city water to the storage facility via pipeline.

The design required two reinforced concrete storage tanks with the following dimensions:

- Height – 4.4 m
- Length - 14 m
- Width - 6 m

The pumping facility design included two sets of three booster pumps (one set to serve in standby mode). Each pump, rated at 24 cubic meters per hour at 50 m of head, is designed to pump water from the storage tanks to the garrison buildings. The design also included three, 5 micron cartridge filters inside stainless steel housings to filter out sediments prior to the water entering the service line to the garrison buildings. Site photo 20 shows the booster pumps. During the site visit, we did not observe any deficiencies associated with the pumps, filters, piping, and valves, including any evidence of leaks or loose connections.



Site Photo 20. Two sets of booster pumps, and cartridge filters are in the background

In addition, the site assessment team inspected the top of the concrete water storage tanks and opened the access hatches to view the interior of the two tanks. There was water inside both of the tanks to a level of about 1 m below the tank cover. The tanks appeared to be well constructed. We did not see any noticeable cracks or other surface defects in the tanks' concrete surfaces.

Perimeter Fence

During the site visit, we verified that the perimeter wall was in place around the garrison compound. A survey of the entire perimeter was not conducted. However, we did look at portions of the wall along the south part of the compound, which is shown in Site Photo 21.



Site Photo 21. One section of the perimeter wall

The design required a 2.5 m high block wall capped with a concrete coping, with three strands of rolled barbed wire on top of the wall. The foundation support for the perimeter wall included reinforced concrete footers to support the columns and a reinforced concrete tie beam under the wall between the columns. According to the architectural plans, at every 2.5 m, a supporting column was required along the wall with expansion joints required every 10 m. However, in the structural plans, a supporting column was required every 3 m and expansion joints every 12 m. Based on our observations, it appeared the contractor followed the spacing requirements from the structural plans. Further, we did not see any evidence of cracking or other noticeable defects along the portion of the south wall that we inspected. The construction of the wall in this section exhibited good quality workmanship.

Work in Progress

At the time of our assessment, all of the original contract work had been completed. Except for punch list work, there was no work in progress.

Work Pending

Pending work is associated with Modification 04, which included the following.

- Provide a complete telephone system
- Connect the garrison's water system to the local water distribution system
- Construct drainage system for the garrison to remove surface runoff from the site
- Supply two additional 20,000 liter fuel tanks for the generators

- Connect the garrison to the national electrical grid
- Construct two additional guard towers along the perimeter wall
- Provide concrete walkways between buildings
- Construct a covered outside food preparation area adjacent to the dining facility's kitchen

Project Quality Management

Contractor's Quality Control Program

The contractor submitted a QC plan and a Health and Safety plan. The QC plan addresses the QC organization, document control, design control, procurement control, control of subcontractors, special processes, inspection, testing, non-conforming items, and records. The assessment team determined the contractor's QC plan met the standards addressed in Engineering Regulation 1180-1-6 (*Construction Quality Management*) or PCO Standard Operating Procedure CN-103 (*Contractor Construction Quality Control Plan*).

The contractor submitted QC reports on a daily basis, which were reviewed by the Project Engineer. These reports contained information such as work accomplished each day with the location, activity and by whom, test results, deficiencies and corrective actions, labor distribution, equipment utilized, and material received on site.

Government Quality Assurance

The Project Engineer maintained daily QA reports that documented any deficiencies noted at the site. Based on our review, we found the local national Quality Assurance Representative (QAR)'s reports to be sufficiently complete, accurate, and timely. In addition to containing project specific information to document construction progress and highlight deficiencies, the QAR also supplemented them with detailed photographs that reinforced the narrative information provided in the reports. The USACE local national QAR also maintained a QA deficiency log, and the Project Engineer and the local national QAR ensured that all deficiencies cited during QA inspections were corrected.

The local national QAR was on site every day in managing the 609th ING Battalion project. He spent a significant amount of their time at the project site interacting with the contractor and observing construction activities. Further, the local national QAR ensured that potential construction deficiencies were detected, evaluated, and properly corrected, in a timely manner.

The Government Quality Assurance program was effective in monitoring the contractor's Quality Control program for the 609th ING Battalion project. In addition, QA activities were sufficiently and accurately documented. This condition occurred because of the efforts of the Project Engineer and local national QAR during the course of the project.

Project Sustainability

The contract specifications required that the contractor shall provide operational and maintenance training for all systems furnished under the contract. The training will be for the operating and maintenance personnel. The system manufacturer will provide the

training. The training shall not take place until the operation and maintenance manuals are submitted and approved. In addition, the contract includes the normal one-year warranty on individual items, equipment, and systems.

The current source of power for the 609th ING Battalion at the time of the turnover to the Iraqi Army was from the two installed ASKA generators, powered by Cummins diesel engines. Requirements for operation and maintenance manuals for the generator were included in the contract, as well as training of on-site personnel. However, pending Modification 04 will provide and supply electrical work to connect the 609th ING Battalion to the national grid, thus enabling the 609th ING Battalion to rely upon the generators as a back up.

The current source of water for the 609th ING Battalion was from the water storage facility, which consisted of two reinforced concrete water storage tanks that contained water supplied by trucks. Requirements for operation and maintenance manuals for the water facility were included in the contract, as well as training of on-site personnel. However, pending Modification 04 will provide and supply a water network system to connect the 609th ING Battalion to the local water distribution system, enabling the 609th ING Battalion not to rely upon water trucked in.

Another issue that could affect sustainability is the poor drainage around the 609th ING Battalion. However, pending Modification 04 will construct a drainage system for the garrison to remove surface runoff from the site. Therefore, as long as the USACE implements Modification 04, poor surface water drainage should not be a continuing problem.

Conclusions

Based upon the results of our site visit, we reached the following conclusions for assessment objectives 1, 2, 3, 4, and 5. Appendix A provides details pertaining to Scope and Methodology.

1. Determine whether project components were adequately designed prior to construction or installation.

The project components were adequately designed prior to construction. The USACE's architectural and engineering consultant developed a generic design package to be used for the construction of four battalion garrisons including the 609th ING Battalion. The design also took into account local availability of materials and labor skills.

The design was based on the original scope of work, and for the majority of the garrison's buildings and facilities, the plans and specifications provided an accurate depiction of the task order requirements. However, the utility system (water and electric) design drawings were not updated to reflect the deleted requirements from Modification 1 and the shift in building site location after the construction had started. In addition, the original design required two, 1600 KVA electrical generators for the garrison. Documentation provided by the USACE PE indicated the generator requirements were reduced to two, 1130 KVA generators, but there was no design analysis provided or revised electrical one line diagram to support the revised requirements. Nonetheless, the contractor was able to properly install the generators and make the necessary electrical connections. Further, although the utility drawings were not updated to reflect the most current requirements, the construction contractor

constructed the majority of 609th ING Battalion garrison facilities using the original set of design drawings and specifications.

2. Determine whether construction met the standards of the design.

The completed project work we observed met the standards of the design. We did note some areas, particularly in the toilet and shower buildings where the quality of finish work was marginal. The marginal finish work in some parts of the garrison's buildings could be attributed to the task order requirement for the contractor to employ a local Iraqi labor force, which was largely unskilled. Although, the unskilled labor presented challenges in constructing the garrison, the U.S. Army Corps of Engineer Project Engineer and U.S. Army Corps of Engineers local national Quality Assurance Representatives were fully engaged in construction activities to ensure quality and compliance with the task order requirements. As a result, the project is providing the Iraqi military with additional garrison facilities for up to 850 army personnel.

3. Determine whether the Contractor's Quality Control plan and the Government Quality Assurance Program were adequate.

The contractor's Quality Control plan was sufficiently detailed to guide the contractor's quality management program effectively. Further, the contractor's daily Quality Control reports contained required project and work activity information to document construction progress, and identify problems. The contractor also prepared daily inspection checklists for each definable feature that was going to be scheduled and worked each day.

The Government Quality Assurance program was effective in monitoring the contractor's quality control program. The Project Engineer and the local national QAR ensured that all deficiencies cited during QA inspections were corrected. The QAR also maintained daily QA reports that contained project-specific information to document construction progress and highlight deficiencies. The QAR also supplemented the daily reports with detailed photographs that reinforced the narrative information provided in the reports.

4. Determine whether project results were consistent with original objectives.

The 609th Iraqi National Guard Battalion garrison project results were consistent with the original task order objectives. The completed project work resulted in a fully functional garrison for the Iraqi military. This occurred because the U.S. Army Corps of Engineer Project Engineer and U.S. Army Corps of Engineers local national Quality Assurance Representatives effectively managed the project.

5. Determine if project sustainability was addressed.

Sustainability was addressed in the contract specifications. The contract specifications required operational and maintenance training for all systems furnished under the contract. In addition, contract specifications required training for the operating and maintenance personnel, and the system manufacturer was to provide the training. The contract also included the normal one-year warranty on individual items, equipment, and systems.

Corrective action and management comments pertaining to this non-finding are not required.

Recommendations.

This report does not contain any negative findings or recommendations for corrective action.

Management Comments.

The USACE GRD concurred with the conclusions in the report. Further, they provided additional information regarding the discussion in the report as noted below:

1. SIGIR Report.

Page i, section 1. However, the utility system (water and electric) design drawings were not updated to reflect the deleted requirements from Modification 01 and the shift in building site location after the construction had started.

Page 4. Based on the review of the design package provided to us, the changes to the scope and site plan noted above were not incorporated into the design drawings. The utility plan in the design package showing the water supply line and valve locations was not updated to reflect the revised site plan with new building locations.

GRD-PCO Comments. Changes made after construction has started will be reflected on the as-built drawings.

2. SIGIR Report.

Page 6. Doors and windows appeared to be installed properly, although on some exterior doors, there were narrow gaps around the door between the door and the frame. We discussed this with the USACE PE, who initiated corrective action to have the contractor install weather stripping and door sweeps.

GRD-PCO Comments. Though not specified in the contract, the contractor has installed weather stripping and door sweeps.

3. SIGIR Report.

Page 11. In addition to the doors, we found the floor tile in many areas needed cleaning.

GRD-PCO Comments. We agreed this work was not of the best quality. The contractor has since improved the floor tile work.

4. SIGIR Report.

Page 16. In inspecting the generators, we could not locate the factory nameplate containing the kVA rating so we were not able to verify the capacity of the generators. The USACE PE subsequently provided the model number on the generator diesel engine,

which is a Cummins QST30-G4. This diesel engine powers an AKSA ACQ 1130 generator, rated at 1026 kVA.

GRD-PCO Comments. The nameplates were removed by the contractor and have since been reinstalled.

Evaluation of Management Comments.

SIGIR acknowledges the comments from GRD-PCO and has no further observations pertaining to the GRD-PCO comments.

Appendix A. Scope and Methodology

We performed this project assessment from March through May 2006 in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included a professional engineer and an auditor.

In performing this Project Assessment we:

- Reviewed contract documentation to include the following: contract, contract modifications, Task Order, Task Order Modifications, and Scope of Work;
- Reviewed the design package (drawings and specifications), Quality Control Plan, Contractor's Quality Control Reports, USACE Quality Assurance Reports, Construction Progress Photos, Punch Lists, and the Turnover Letter;
- Interviewed the U.S. Army Corps of Engineers Area Engineer, Resident Engineer, and Project Engineer; and
- Conducted an on-site assessment and documented results at the 609th Iraq National Guard Battalion Garrison construction project in Iraq's Thi Qar Governorate.

Appendix B. Acronyms

A-E	Architectural-Engineering
GRS	Gulf Region South
HVAC	Heating, Ventilation and Air Conditioning
ING	Iraqi National Guard
km	kilometer
kV	Kilovolt
kVA	Kilo Volt Amp
mm	Millimeter
m	Meter
m ²	Square Meter
PCO	Project and Contracting Office
PE	Project Engineer
QA	Quality Assurance
QAR	Quality Assurance Representative
QC	Quality Control
RE	Resident Engineer
SOW	Scope of Work
USACE	United States Army Corps of Engineers
V	Volt

Appendix C. Report Distribution

Department of State

Secretary of State

Senior Advisor to the Secretary and Coordinator for Iraq

U.S. Ambassador to Iraq

Director, Iraq Reconstruction Management Office

Inspector General, Department of State

Department of Defense

Secretary of Defense

Deputy Secretary of Defense

Director, Defense Reconstruction Support Office

Under Secretary of Defense (Comptroller)/Chief Financial Officer

Deputy Chief Financial Officer

Deputy Comptroller (Program/Budget)

Inspector General, Department of Defense

Department of the Army

Assistant Secretary of the Army for Acquisition, Logistics, and Technology

Principal Deputy to the Assistant Secretary of the Army for Acquisition,

Logistics, and Technology

Deputy Assistant Secretary of the Army (Policy and Procurement)

Assistant Secretary of the Army for Financial Management and Comptroller

Chief of Engineers and Commander, U.S. Army Corps of Engineers

Commanding General, Gulf Region Division

Auditor General of the Army

U.S. Central Command

Commanding General, Multi-National Force - Iraq

Commanding General, Joint Contracting Command – Iraq/Afghanistan

Commanding General, Multi-National Corps – Iraq

Commanding General, Multi-National Security Transition Command – Iraq

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Inspector General, Department of Commerce
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Mission Director – Iraq, U.S. Agency for International Development

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 Subcommittee on Defense
 Subcommittee on State, Foreign Operations and Related Programs
Senate Committee on Armed Services
Senate Committee on Foreign Relations
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 Subcommittee on Near Eastern and South Asian Affairs
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House Committee on Armed Services
House Committee on Government Reform
 Subcommittee on Management, Finance and Accountability
 Subcommittee on National Security, Emerging Threats and International Relations
House Committee on International Relations
 Subcommittee on Middle East and Central Asia

Appendix D. Project Assessment Team Members

The Office of the Assistant Inspector General for Inspections, Office of the Special Inspector General for Iraq Reconstruction, prepared this report. The principal staff members who contributed to the report were:

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